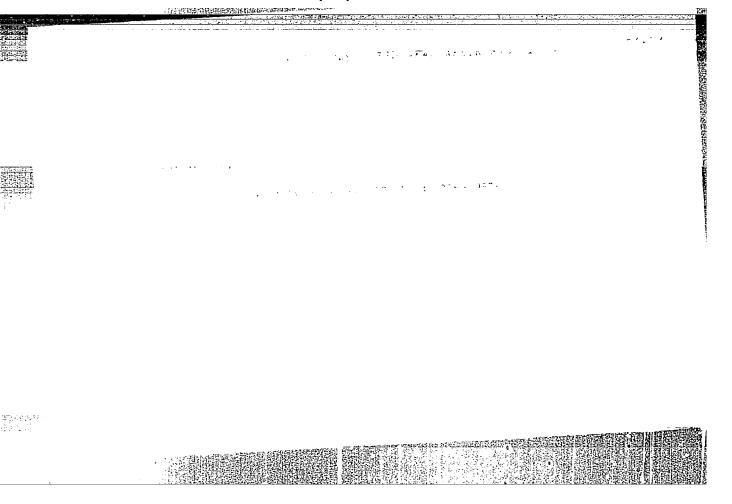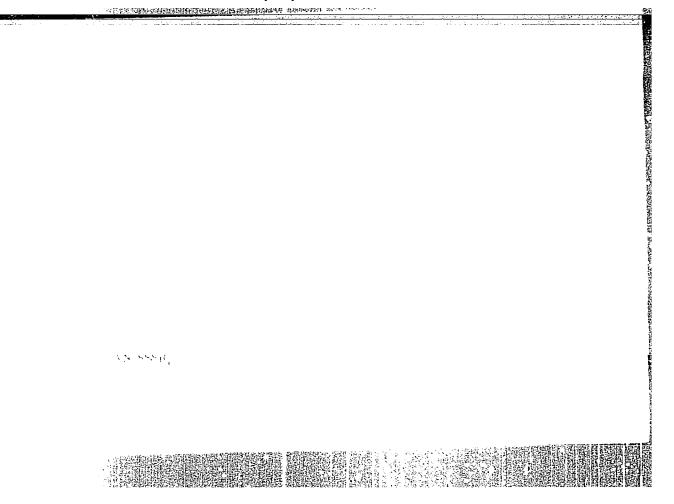KESSEL', A.R.

Quantum theory of transients in paramagnetic resonance (effective spin 1, equidistant spectrum). Fiz. tver. tela 5 no.11:3120-3129 N '63.   (MIRA 16:12)
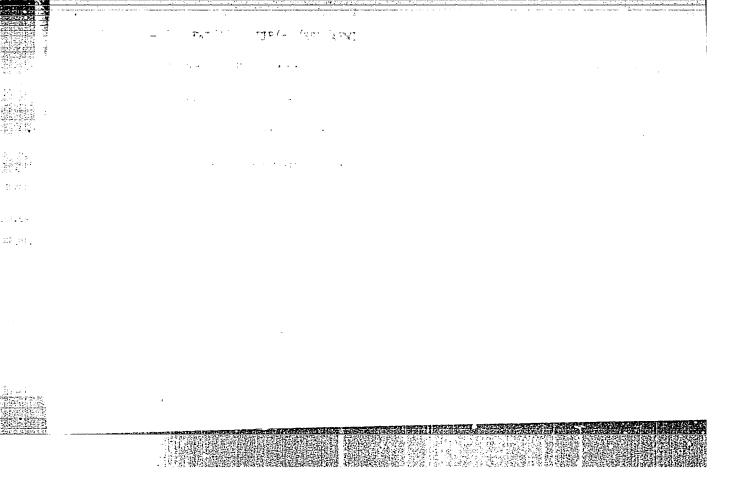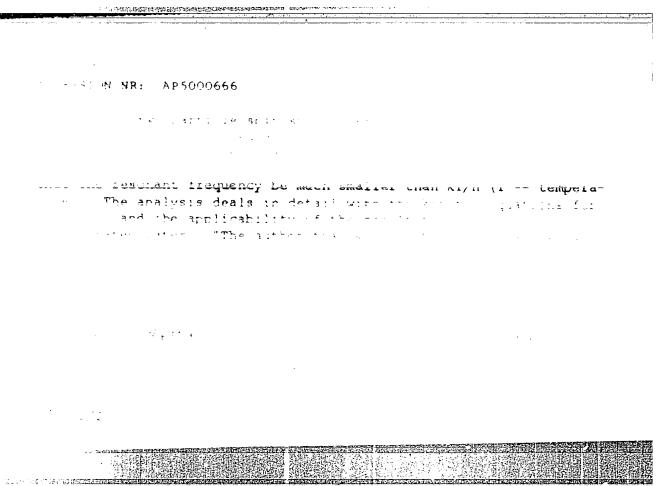
1. Fiziko-tekhnicheskiy institut AN SSSR, Kazan'.

ON NR: AP5000666

resonant frequency be much smaller than κ_1/n (t — tempera-
The analysis deals in detail with
and the applicability of the
"The author

L. 31167-66   EWT(d)/EWT(1)   IJP(c)   WW/GG SOURCE CODE: UR/0181/66/008/002/0387/0396

ACC NR: AP6006819

AUTHOR: Kessel', A. R.; Korchemkin, M. A.

ORG: Kazan Physicotechnical Institute (Kazanskiy fiziko-tekhnicheskiy institut)

TITLE: Theory of transients in nuclear quadrupole resonance

SOURCE: Fizika tverdogo tela, v. 8, no. 2, 1966, 387-396

TOPIC TAGS: nuclear quadrupole resonance, spin system, nuclear resonance, multiple order

ABSTRACT: Equations have recently been derived for extending the phenomenological Bloch equations to spin systems with arbitrary spectra for the case of quadrupole and higher multipole interactions. These equations may also be applied to solid paramagnetics. The authors test these new equations on a specific spin system chosen in such a way that it has all the limitations which prevent the use of the phenomenological Bloch equations. Transient processes are studied in quadrupole resonance of nuclei in solids with regard to spin-spin and quadrupole interactions. No limitations are imposed on the symmetry of the crystal field nor on the direction

Card 1/2

ACC NR: AP7011829

SOURCE CODE: UR/0079/66/036/010/1835/1838

AUTHOR: Nesterov, L. V.; Kessel', A. Ya.

ORG: Institute of Organic and Physical Chemistry, Academy of Sciences of the USSR, Kazan' (Institut organicheskoy i fizicheskoy khimii AN SSSR)

TITLE: Reaction of salts of aromatic quasiphosphonium bases with ortho esters of carboxylic acids and acetals

SOURCE: Zhurnal obshchey khimii, v. 36, no. 10, 1966, 1835-1838

TOPIC TAGS: acetal, carboxylic acid, organic salt, reaction mechanism, ester

SUB CODE: 07

ABSTRACT: Salts of aromatic quasiphosphonium bases were found to react with ortho esters of carboxylic acids and acetals, exchanging a phenoxy group for an alkoxy group. The reactions were conducted between methyltriphenoxyphosphonium and methylphenyldiphenoxyphosphonium iodides as the salts of aromatic quasiphosphonium bases and triethyl orthoformate, triethyl orthoacetate, and dimethylformal as the ortho esters and acetals. The reaction mechanisms are discussed. The ortho esters and acetals behave as weak nucleophilic reagents in these reactions. They are insufficiently active to attack the neutral phosphorus atom in triphenyl phosphite,
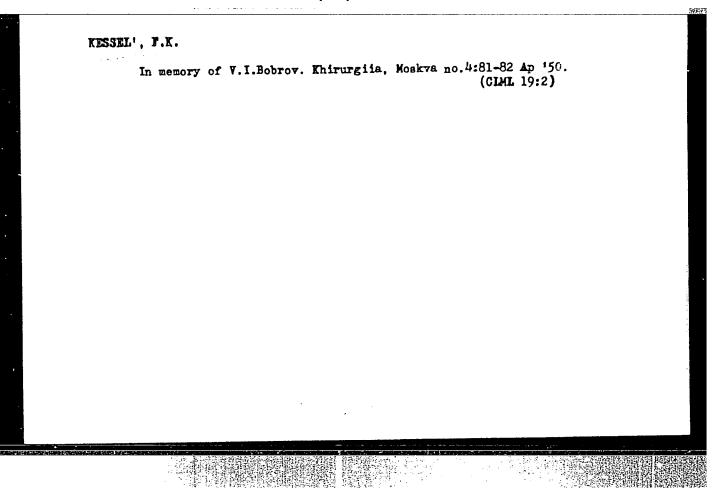
Card 1/2

UDC: 547.26'118+547.426.3

---

which does not participate in the redistribution reaction with ortho esters and acetals. The ester methyl formate, in view of its low nucleophilic properties, does not react with methyltriphenoxyphosphonium iodide even after many hours of heating in a sealed tube. Orig. art. has: 6 formulas and 1 table. [JPRS: 40,351]

Card 2/2

KESSEL', F.K.

    In memory of V.I.Bobrov. Khirurgiia, Moskva no.4:81-82 Ap '50.
                                    (CLML 19:2)

VORONITSYN, K.I., inzhener; KESSEL', I.V., inzhener; ORESHKIN, S.I.,
    inzhener.

Mechanization of tree felling, loading and hauling of lumber. Mekh.
trud.rab. 9 no.3:42-46 Mr '55.   (MIRA 8:5)
        (Lumbering--Machinery) (Tree felling)

MARKOV, L.I.; ISTOMIN, G.V.;KRESTIN, G.I.; KESSEL', I.V.;
     POLYANTSEV, V.A., red.

     [Guzeripl' Logging Camp]Guzeripl'skii lespromkhoz. [n.p.]
     TSentr. nauchno-issl. in-t mekhanizatsii i energetiki les-
     noi promyshl. 1962. 5 p.   (MIRA 16:4)
          (Guzeripl' region—Lumbering)

ZOTOV, G.A.; BEREZIN, V.P.; SHALAYEV, S.A.; KESSEL', I.V.;
        POLYANTSEV, V.A., red.

    [Olenino Logging Camp] Oleninskii lesopromkhoz. Khimki,
    TSentr. nauchno-issl. in-t mekhanizatsii i energetiki
    lesnoi promyshl., 1962. 30 p.   (MIRA 16:4)
        (Olenino region--Lumbering)

KESSEL', I.V.

Preparation of chips in cutover areas.   Bum.prom. 38 no.1:30-31
Ja '63.   (MIRA 16:2)
              (Woodpulp industry--Research)

KESSEL, J.; ZY CITTER, J.

Some problems of production ... in the ... industry. p. 60.

NAUKOWA ... (Stowarzyszeni ... I ... Polskich) Warszawa, Poland. Vol. 18, no. 21, ... 1956.

Monthly List of East European Accessions (EEAI) LC, Vol. 5, no. 2, Feb. 1959. Uncl.

VORONITSYN, K.I.; KESSEL', I.V.; SKOTNIKOVA, N.V., red.;

[Central Scientific Research Institute on Mechanization and the
Use of Power in Lumbering]TSentral'nyi nauchno-issledovatel'skiy
institut mekhanizatsii i energetiki lesnoi promyshlennosti. Mo-
skva, 1962. 8 p.
                                     (MIRA 16:1)

1. Khimki. TSentral'nyy nauchno-issledovatel'skiy institut mekha-
nizatsii i energetiki lesnoy promyshlennosti.
                   (Lumbering—Machinery)

KESSEL', I.V., inzh.

Lumbering machine units. Mekh.i avtom.proizv. 16 no.8:51-52
Ag '62.

(Lumbering--Machinery)   (MIRA 15:9)

KISSEL, K.

Dr med. Leon Kalina, 1893-1942 Chir. narz. ruchu ortop. polska
19 no.3:209-211 1954.
            (BIOGRAPHIES,
                Kalina, Leon)

KESSEL', L.A.

Using the heat from compressed air to produce distilled water. Suggestion by L.A. Kessel'. Prom.energ. 11 no.7: 17-18 Jl '56.

(MLRA 9:10)

(Compressed air) (Water, Distilled)

KESSEL', M. Z.

Kessel', M. Z. - "Capacity and zoning of the Yevpatoriya spa during its general reconstruction period," Trudy Ob"edin. nauch. soveta pri Upr. Yevpator. kurorta, Vol. VII, 1948, p. 7-13

SO: U-4355, 14 August 53, (Letopis 'Zhurnal 'nykh Statey, No. 15, 1949.)

KESSEL', N.K.; OVCHINNIKOV, E.V.; KUCHUR, Ye.S.; GALKIN, P.A.; MOLIBOSHKO, V.A., red.

[Equipment and devices for assembling structural elements] Oborudovanie i prisposobleniia dlia montazha stroitel'nykh konstruktsii. Minsk, Redaktsionno-izdatel'skii otdel BPI im. I.V.Stalina, 1960. 48 p.   (MIRA 14:6)

(Building--Tools and implements)
(Precast concrete construction)

KESSEL', N.K., dotsent, kand.tekhn.nauk

Department of Construction. Sbor.nauch.trud.Bel.politekh.inst. no.
66:27-34 '57.   (MIRA 16:9)

1. Dekan stroitel'nogo fakul'teta Belorusskogo politekhnicheskogo
instituta imeni Stalina.

SAAKYAN, A.G.; KAZANCHEV, M.I.; KESSEL', V.P.

Ability of K-strophanthin and calcium to restore the activity
in the frog's heart arrested by cortisone. Farm. i toks. 26
no.2:206-210 Mr-Ap '63.   (MIRA 17:8)

1. Pyatigorskaya klinika Gosudarctvennogo nauchno-issledo-
vatel'skogo bal'neologicheskogo instituta na Kavkazskikh
Mineral'nykh Vodakh.

KESSEL', V.P.; KUBASOVA, N.M.

Arachnodactyly (Marfan's disease). Terap.arkh. no.8:123-124 '62.
(MIRA 15:12)
1. Iz Pyatigorskoy kliniki Bal'neologicheskogo instituta (dir. -
kand.med.nauk Ye.A. Smirnov-Kamenskiy).
(ARACHNODACTYLY)

KESSEL', V.P.

Hemangiomatosis of the bones as a manifestation of disseminated
vascular disease. Vestn. rent. i rad. 38 no.3:65-67 My-Je '63.
(MIRA 17:7)
1. Iz astrologicheskogo otdeleniya Pyatigorskoy kliniki Gosu-
darstvennogo bal'neologicheskogo institute (dir. - kand. med.
nauk Ya.A. Smirnov-Kamenskiy) na Kavkasskikh Mineral'nykh
Vodakh.

KESSEL', Yu.R.

Subcapsular diphasic rupture of the liver. Zdravookhranenie
6 no.3:58-59 My-Je'63.   (MIRA 16:11)

1. Iz Yedinetskoy rayonnoy bol'nitsy (glavnyy vrach - I.A.
Dimand).

PHASE I   BOOK EXPLOITATION   SOV/3844

Kessel'man, A.S.

Tokar'-universal v priborostroyenii (All-Round Lathe Operator in the
    Instrument Making Industry) Leningrad, Sudpromgiz, 1959. 254 p.
    Errata slip inserted. 15,300 copies printed.

Scientific Ed.: N.V. Kashin; Ed.: V.S. Chichkanova; Tech. Ed.:
    R.K. Tsal.

PURPOSE: This book is intended for lathe operators, machine shop
    foremen, and students of technical and trade schools.

COVERAGE: Fundamentals of the theory of metal cutting, concepts of
    surface roughness and engineering measurements are given along
    with drawing standards used in machine building. Modern design
    of cutting tools and other devices used in lathework in the Soviet
    Union and in other countries is described. Works of the Lenin-
    gradskiy politekhnicheskiy institut (Leningrad Polytechnic Insti-
    tute), the Institut tochnoy mekhaniki i optiki (Institute of Pre-
    cision Mechanics and Optics), and the Institut aviatsionnogo pri-
    borostroyeniya (Institute for Aircraft Instruments) have contri-

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All-Round Lathe (Cont.)   SOV/3844

    buted significantly to developments in the field of machining on
    lathes. No personalities are mentioned. There are 15 references,
    all Soviet.

TABLE OF CONTENTS:

Card 2/4

KESEL'MAN, G.; LUKIN, M.

Tower substation of precast reinforced concrete. Sel'. stroi. 15
no. 2:12-13 F '61.   (MIRA 14:5)

1. Nachal'nik proizvodstvenno-tekhnicheskogo otdela Moskovskogo
tresta "Sel'elektrostroy" (for Kesel'man). 2. Starshiy inzh.
Moskovskogo tresta "Sel'elektrostroy" (for Lukin).
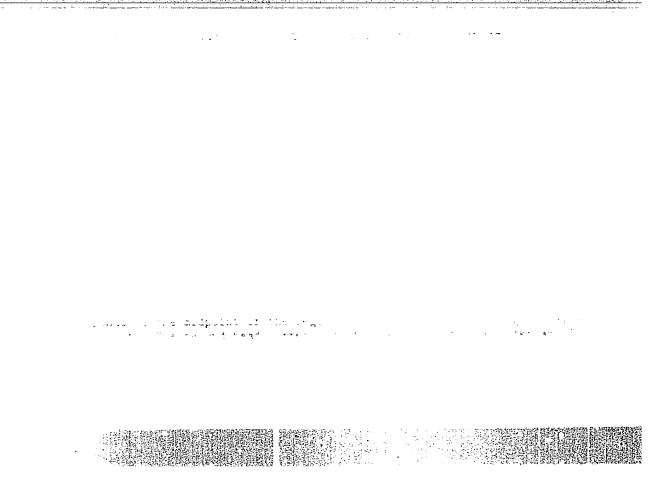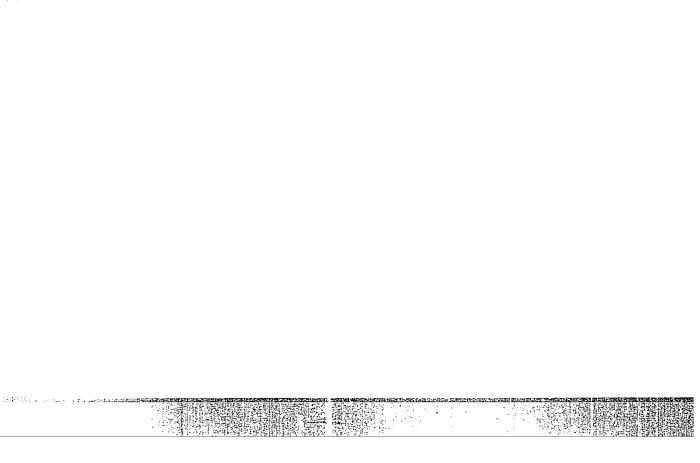   (Precast concrete construction)
                (Electric substations)

KESEL'MAN, I.A., tekhnik

Welding and strengthening the frame of a forging and
die-stamping press. Svar.proizv. no.7:33-34 Jl '60.
(MIRA 13:7)

1. TSentral'nyye eksperimental'nyye svarochnyye masterskiye
Vsesoyuznogo nauchno-issledovatel'skogo instituta avtogennoy
(Power presses—Welding)

KESSEL'MAN, L.I.; KHOCH, G.K. [Khoch, H.K.]

Attachment to the Class 27 button machine for the sewing of
buttons with eyelet end. Leh. prom. no.3:77   Jl-S '65.
(MIRA 18:9)

KESSEL'MAN, L.M., insh.

Cases of heavy ice deposit formation on lines in Central Asia.
Elek. sta. 30 no.3:90-91 Mr '59.   (MIRA 12:5)
(Soviet Central Asia—Electric lines—Cold weather conditions)

KESSEL'MAN L. M.

KESEL'MAN, L.M., inzh.

In reference to the article "Calculating intermediate supports for
overhead electric power lines under outage conditions."
Elek.sta. 29 no.9:87 S '58.   (MIRA 11:11)
                    (Electric lines--Poles)

KESSEL'MAN, M. Sh.

Kessel'man, M. Sh. - "Investigation of Conditions Providing for Increased Effectiveness of the Process of Drawing Sheet Metal." Min Higher Education Ukrainian SSR. Khar'kov Polytechnic Inst imeni V. I. Lenin. Khar'kov, 1956 (Dissertation for the Degree of Candidate in Technical Sciences).

So: Knizhnaya Letopis', No. 10, 1956, pp 116-127

K E S S E L' m A N , M · S H

137-58-5-9586

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 107 (USSR)

AUTHOR: Kessel'man, M.Sh.

TITLE: The Magnitude and Nature of Pad Pressure in Deep Drawing
(O velichine i kharaktere davleniya prizhima pri glubokoy
vytyazhke)

PERIODICAL: V sb.: Progressivn. metody shtampovki i kovki. Khar'kov,
Oblizdat, 1957, pp 226-231

ABSTRACT: An increase in the efficiency of deep drawing depends upon
the magnitude and nature of the load on the pad. An investigation
shows that the latter factor is the more important one. Pads
should be applied with variable optimum force.

V.F.

1. Presses--Operation   2. Metals--Processing

Card 1/1

137-58-1-697

KE   EL-MAN, M. Sh.

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 1, p 106 (USSR)

AUTHOR: Kessel'man, M. Sh.

TITLE: A Rational Design for a Pressure Pad (O ratsional'noy skheme skladkoderzhatelya)

PERIODICAL: Tr. Khar'kovsk. politekhn. in-ta, 1957, Vol 9, pp 149-154

ABSTRACT: An investigation with the object of determining the optimum nature of action of a pressure pad for use in the drawing of a bell-shaped detail of sheet metal. The variable stress required for the pressure pad should, it is recommended, be obtained by means of a spring-loaded, pre-compressed pad. An example of pad selection is presented.

Ya.O.

1. Pressure pads--Design

Card 1/1

S/081/62/000/017/092/102
B177/B186

AUTHOR: Kestel'man, N. Ya.

TITLE: Investigation of the wearing properties of caprone
               subjected to sliding friction

PERIODICAL: Referativnyy zhurnal, Khimiya, no. 17, 1962, 545, abstract
               17P86 (In collection: Plastmassy v mashinostr. i priborostr.
               Kiyev, Gostekhizdat USSR, 1961, 325 - 334)

TEXT: Results are quoted from research into the wear-resistance of caprone
and into the effect of certain technological factors on its hardness.
The wear caused to caprone is shown to obey the laws governing abrasive
wear. The wear-resistance of caprone is higher than that of bronze and
cast iron, and increases when silver graphite is added. A portable
instrument for rapidly determining the hardness of components of any
shape is recommended. [Abstractor's note: Complete translation.]

Card 1/1

KESSEL'MAN, P.M.

Form of the equation for the state of a real gas [with summary
in English]. Inzh.-fiz.zhur. no.1:68-75 Ja '59.
(MIRA 12:1)

1. Institut inzhenerov morskogo flota, Odessa.
(Gases)

24(8)

AUTHOR: Kessel'man, P.M.

TITLE: On the Problem of Determining the Temperature Function for the
             Equation of State of a Real Gas (K voprosu opredeleniya tempera-
             turnoy funktsii uravneniya sostoyaniya real'nogo gaza)

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 5, pp 8-14 (USSR)

ABSTRACT: The equation of   state of a real gas, expressed in dimension-
             less parameters $\sigma = \dfrac{Pv}{RT_K}$, $\omega = \dfrac{v_K}{v}$ and $\tau = \dfrac{T}{T_K}$, looks as follows:

$$\sigma = \alpha_0 + \alpha_1 \tau + \beta \psi + \gamma \psi^2 + \delta \psi^3 \ldots$$

where $\alpha_0, \alpha_1, \beta, \gamma, \delta, \ldots$ are infinite series of the reduced density
ω and ψ is a monotonously decreasing function of reduced tempera-
ture τ. This equation is a generalization of the equation of
state proposed by Professor Ya.Z. Kazavchinskiy [Ref 2]. The
problem of composing the equation of state is reduced therefore
to the finding of several elementary volume functions $\alpha_0, \alpha_1, \beta,$
$\gamma \ldots$ and one temperature function ψ, each of which depends upon
but one variable ω or τ. Of these, the temperature function is
the most important one. Certain approximate methods for determin-

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On the Problem of Determining the Temperature Function for the Equation of State
of a Real Gas

ing the temperature function ψ are expounded in References 2 and 3.
The present paper describes another, more accurate method of ψ-de-
termination which can be used if data on thermal (PVT) and caloric
values in the region of low pressures are available. The method
consists in the re-writing of the equation of state in virial form,
computing the values of $\dfrac{d^2 \psi}{d\tau^2}$ on the basis of the analysis of ex-
perimental data on P, v, T, enthalpy and specific heat in the re-
gion of low pressures; finding the analytical expression for the
function $f(\tau) = \dfrac{d^2 \psi}{d\tau^2}$, and finally integrating this function
twice, in order to obtain the function ψ, assuming the constants
of integration to be zeros. The author applies this method to de-
termination of the temperature function for   water vapor, using
experimental data of Keyes [Ref 4], Kennedy [Ref 5], Havlicek
and Myskowsky [Ref 6], Egerton and Callendar [Ref 7], Osborne
[Ref 8], D.L. Timrot and A.M. Sirota [Ref 11]. As a result of
this determination the temperature function was found to have the
following form: $\psi = \dfrac{1}{\tau^{3.82}}$

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10(5)   SOV/170-59-7-1/20

AUTHORS: Kazavchinskiy, Ya.Z., Kessel'man, P.M.

TITLE: Basic Data on Specific Volume of Water and Water Vapor

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 7, pp 3 - 7 (USSR)

ABSTRACT: The 5th International Conference on the Properties of Water Vapor held in
             London in 1956 decided to perform an analysis of experimental data avail-
             able in order to compile International Tables of Water and Water Vapor.
             The present paper contains the Table of basic values of specific volumes
             of water and water vapor for pressures ranging from 1 to 1,000 atmospheres
             and temperatures from 0 to 800°C, and describes the method of its compila-
             tion. The coordination of experimental data in the region of vapor was
             carried out in three successive approximations. In the first approxima-
             tion, the graphical coordination of data was carried out by isochores in
             coordinates of σ and T, and by isotherms in coordinates of σ and ω. Then,
             according to the data of the first graphical approximation, a simple equa-
             tion was composed which describes the family of straight lines, given by
             Formula 3. The second approximation was carried out by deviations of $\Delta\sigma$
             from the auxiliary straight lines being approximates to the actual
Card 1/3   asymptotes of real isochores. Isotherms and isochores, plotted by $\Delta\sigma$,

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Basic Data on Specific Volume of Water and Water Vapor   SOV/170-59-7-1/20

were jointly coordinated. The obtained results served as a base for the final, third coordination carried out analytically by making use of the equation of state, Formula 1. This resulted in the calculation and plotting of a new analytical network of isochores and isotherms, consistent in the best way with the experimental PVT-data. The coordination of data in the region of liquid water was carried out by isobars and isotherms. The data of the following investigators were laid down at the base of the present study: Kirillin, Rumyantsev, Zubarev and Ulybin /Refs 2,3/, Timrot /Ref 4/, Keyes /Ref 6/, Kennedy with co-workers /Refs 7,8,9/, Keyes and Smith /Ref 10/, Amagat /Ref 11/, and Osborne /Ref 12/. The values of the Table compiled agree well with the experimental data of the above writers: over

Card 2/3   85% of the total of 1,786 experimental points used deviate from the tabular

Basic Data on Specific Volume of Water and Water Vapor

05270

SOV/170-59-7-1/20

values not more than by 0.2%. The Table gives data on the average and maximum deviations of experimental data from the calculated basic ones. There are: 2 tables and 12 references, 5 of which are Soviet, 6 English and 1 French.

ASSOCIATION: Institut inzhenerov morskogo flota (Institute of Naval Engineers), Odessa.

Card 3/3

5(4)

AUTHORS: Zagoruchenko, V. A., Kessel'man, P. M.   SOV/76-33-6-9/44

TITLE: On the Representation of the Equation of State of a Real Gas in the Explicit Form, Expressed by the Independent Variables T and v
(O predstavlenii v yavnoy forme uravneniya sostoyaniya real'nogo gaza, vyrazhennogo cherez nezavisimyye peremennyye T i v)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 6, pp 1221-1229 (USSR)

ABSTRACT: On the strength of results obtained from investigations made on real gases (water vapor, carbon dioxide, methane and ethane) the possibility is stated in the present paper of a transition of the mathematical representation of the equation of state (ES) for real gases by the variables T and v $[p = f(T,v)]$ to a corresponding equation expressed by the variables T and p $[v = \psi(T,p)]$ in explicit form. Respective mathematical derivations are given, and it is found that the (ES) with the variables T and p [equation (4)] reproduces the thermal and caloric properties of gas with the same accuracy as the (ES) with the variables T and v [equation (3)]; this holds, however, for a small density range which is determinable by the aid of a simple criterion (14). The values of the virial coefficients for CH_4 and C_2H_6 (Table 1) and CO_2 and H_2O (Table 2)

Card 1/2

On the Representation of the Equation of State of a Real Gas SOV/je-33-6-9/44
in the Explicit Form, Expressed by the Independent Variables T and v

are given, and so are the corresponding values for the gases under
investigation, which confirm the applicability of equation (4)
(Tables 3-8) and (Fig 4). The transition to the explicit form of the
(ES) considerably facilitates the computation of the thermodynamic
values in the range of low pressures; the values obtained are
reliable; hence, the tabulation of the thermodynamic properties of
real gases is made possible. There are 4 figures, 8 tables, and
9 references, 6 of which are Soviet.

SUBMITTED: September 25, 1957

Card 2/2

KESSEL'MAN, P. M., CAND TECH SCI, INVESTIGATION OF THE

THERMODYNAMIC PROPERTIES OF COOLANTS OF MODERN POWER PLANTS.

MOSCOW, 1960. (UNION MAIN ALL-UNION ORDER OF LA-

BOR RED BANNER SCI RES INST IM F. E. DZERZHIN-

SKIY). (KL, 2-61, 208).

-139-

24,5300

AUTHOR: Kessel'man, P.M., Engineer

TITLE: The Equation of State of Heavy Water for the Liquid Phase

ABSTRACT: Considerable experimental data is now available about the thermal properties of liquid heavy water but there are no experimental data on its caloric properties. The author accordingly attempted to formulate the equation of state for the liquid phase so as to obtain reliable caloric data. Previously-published experimental work was used. The form of the equation of state used to express the p-v-T relationship was that proposed by Byron, see Eq (1). This equation is considered reliable only at temperatures below 250°C and at temperatures from 250 to 380°C it is necessary to introduce an additional term given by expression (2). Hence the final form of the equation of state is that given by Eq (3). The method of determining the coefficients entering into this equation is explained. It is considered that this equation of state reliably describes

Card 1/2

The Equation of State of Heavy Water for the Liquid Phase

the p-v-T relationship for liquid heavy water and may be used in drawing up detailed tables of its thermodynamic properties. There are 6 references, 2 of which are Soviet, 3 English and 1 German.

ASSOCIATION: Odesskiy institut inzhenerov morskogo flota (Odessa Institute of Naval Engineers)

Card 2/2

KESEL'MAN, P.M., insh.

Thermodynamic similarity between ordinary and heavy water.
Teploenergetika 7 no.3:83-87 Mr '60.   (MIRA 13:5)

1. Odesskiy institut inzhenerov morskogo flota.
        (Water)   (Deuterium oxide)

$5.4300 (1273)$

AUTHORS: Kazavchinskiy, Ya. Z., Kessel'man, P. M., Rabinovich, V. A.

TITLE: The second virial coefficient and its extrapolation for
                high temperatures

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, no. 12, 1961, 16-21

TEXT: The present paper deals with the extrapolation of the second virial
coefficient well above a temperature range of interest to experiments using
the Lennard-Jones potential. From the second virial coefficient

$$B = 2\pi N \int_0^\infty (1 - e^{-U/kT})r^2 dr$$ and from the Lennard-Jones potential

$U(r) = 4U_o\left[(r_o/r)^{12} - (r_o/r)^6\right]$ it follows that $B = (2/3)\pi Nr_o^3 F(z)$ or

$B = b_o F(z)$, (5), for $z = kT/U_o$; $b_o = (2/3)\pi N_o^3$. N = Avogadro number,

k = Boltzmann constant, $U = U(r)$ = potential energy of interaction between
two molecules at a distance r, U_o = minimum potential energy, r_o = distance

where $U = U_o$. Eq. (5) can be written as $\log B = \log b_o + \log F$ (6) and

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29991
S/170/61/000/012/001/011
B125/B138

The second virial coefficient ...

$\log z = \log (k/U_o) + \log T$ (7). The conformity of curves (6) and (7) confirms the accuracy of Eq. (5) and makes it possible to calculate the potential parameters for a substance to be studied. b_o and k/U_o can be used to calculate B for high temperatures with the help of Eq. (5). The method described furnishes results for monatomic gases, which agree well with theoretical and experimental values of the second virial coefficient. Eq. (5) describes experimental data for the second virial coefficient of polyatomic gases unsatisfactorily. The Lennard-Jones potential, therefore is also unable to describe complex molecular structures satisfactorily. By translating and rotating the coordinate system used for the experimental curve of the second virial coefficient it is possible to obtain conformity of the coordinates $\log B$, $\log T$, or $\log |F|$, $\log z$, which represent values of the experimental and theoretical curves. The usefulness of this method has been checked with N_2, H_2, D_2, O_2, CO, air, CO_2, and CF_4. The temperature dependence of the potential parameters U_o and b_o has to be taken into account for complex molecular structures. If $U_o = U_o(T)$ and $b_o = b_o(T)$ are known, it will be possible to calculate the values of the second virial

Card 2/3

KESSEL'MAN, P.M.; TABACHNIKOV, A.G.

Determining the equilibrium constant for the reaction of ammonia dis-
association over wide temperature and pressure ranges. Inzh. -fiz.
zhur. 5 no.10:19-25 O '62.   (MIRA 15:12)

1. Institut inzhenerov morskogo flota, Odessa.
            (Chemical equilibrium)   (Ammonia)

KAZAVCHINSKIY, Ya.Z., prof.; KESSEL'MAN, P.M., kand. tekhn. nauk;
KIRILLIN, V.A., akademik; RIVKIN, S.L., kand. tekhn.
nauk; SYCHEV, V.V., kand. tekhn. nauk; TIMROT, D.L.,
prof.; SHEYNDLIN, A.Ye., prof.; SHPIL'RAYN, E.E., dots.;
BUL'DYAYEV, N.A., tekhn. red.

[Heavy water; its thermophysical properties] Tiazhelaia
voda; Teplofizicheskie svoistva. Moskva, Gosenergoizdat,
1963. 255 p.   (MIRA 17:2)

1. Nauchno-issledovatel'skiy institut vysokikh temperatur pri
Moskovskom energeticheskom institute (for Kirillin, Sychev,
Timrot, Sheyndlin, Shpil'rayn). 2. Vsesoyuznyy nauchno-
issledovatel'skiy teplotekhnicheskiy institut imeni F.E.
Dzerzhinskogo (for Rivkin). 3. Odesskiy institut inzhenerov
morskogo flota (for Kazavchinskiy). 4. Odesskiy tekhnologi-
cheskiy institut (for Kessel'man).

KESSEL'MAN, P.M.

Equation of state and the thermodynamic properties of oxygen.
Inzh.-fiz. zhur. 6 no.6:61-67 Je '63.   (MIRA 16:6)

1. Institut inzhenerov morskogo flota, Odessa.
            (Oxygen—Thermodynamic properties)
            (Equation of state)

L 17163-63   EPF(c)/EWT(1)/EPF(n)-2/EWP(q)/EWT(m)/BD∟   AFFTC/ASD/
SSD   Pr-4/Pu-4   JD

ACCESSION NR: AP3004293   S/0170/63/006/007/0043/0049

AUTHOR: Kessol'man, P. M., Rabinovich, V. A.

TITLE: Thermodynamic properties of disssociated hydrogen and oxygen

SOURCE: Inzhenerno-fizicheskiy zhurnal, v. 6, no. 7, 1963, 43-49

TOPIC TAGS: thermodynamic property, dissociated hydrogen, dissociated oxygen,
specific volume, enthalpy, entropy, chemical equilibrium

ABSTRACT: The article uses the theory of chemical equilibrium to determine the
balanced compositions of mixtures formed in the dissociation of hydrogen and
oxygen. It calculates the thermodynamic properties of dissociated H_2 and O_2 at
2000-4000C and 2000-3000C, respectively, and pressures of $(1-500)10^5$ n/cu m.
Two papers by the authors in IFZh No. 5, 1963, gave the equations for the state
of molecular hydrogen and oxygen (without consideration of dissociation) at 4000
and 3000C, respectively, and pressures up to $5 \cdot 10^7$ n/cu m. The detailed
thermodynamic tables of specific volume, enthalpy and entropy of H_2 and O_2

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L 17163-63

ACCESSION NR: AP3004293

calculated by those equations were the basis for calculating the properties of the substance studied with consideration of their dissociation at high temperatures. At temperatures above 2000C, at which there is already a perceptible dissociation, atomic hydrogen and oxygen can be regarded as practically ideal gases. By the theory of chemical equilibrium, $K_p = \dfrac{(1-x)^2}{x} p$,

where x is the mol content of undissociated mass in the mixture, and $K_p = \dfrac{K_{po}}{K_{gamma}}$,

where K_{gamma} is determined by the volatility data on each component, for which the article gives formulas. For mixtures of the type $A_2 + 2A$ (A = atom),

$K_{gamma} = \dfrac{gamma_A^2}{gamma_{A_2}}$, where the coefficient of activity $gamma = f/p$. Thus, to

determine the K_p of hydrogen and oxygen dissociation reactions one has to know K_{po} in dependence upon the temperature for each of the substances studied, as

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L 17163-63

ACCESSION NR: AP3004293

well as the volatilities of H_2 and O_2, which are found from the equations of state for those components. The authors regard as justified the application of Amag's law for calculating the properties of a mixture by the equation $V_{mix} = V_1 x + V_2 (1 - x)$, at the same pressure and temperature. On the basis of this and the relationships between thermal and caloric values, the following formulas for the calculation of enthalp and entropy are obtained:

$$J_{mix} = J_1 x + J_2 (1 - x),$$

$$S_{mix} = S_1 x + S_2 (1 - x) - AR \quad [x \ln x + (1 - x) \ln (1 - x)],$$

Table 1 gives mol content of molecular H and O in a reacting mixture (balanced composition) at 11 temperatures between 2000 and 3000 C; table 2, the specific valumes and enthalpies of dissociated H and O at the same temperatures. Orig. has 2 tables and 15 numbered equations.

ASSOCIATION: Institut inzhenerov morskogo flota, Odessa (Institute of Naval Engineers)

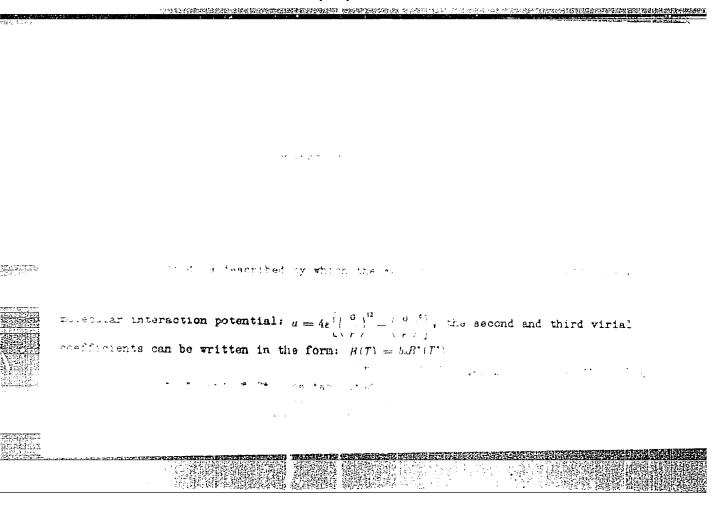| SUBMITTED: 17Jan63	DATE ACQ: 08Aug63	ENCL: 00
SUB CODE: PH	NO REF SOV: 003	OTHER: 010

Card 3/3

KESSEL'MAN, P.M.; TABACHNIKOV, A.G.

Determining the equilibrium constant of the reaction of ammonia
dissociation over a wide range of temperatures and pressures.
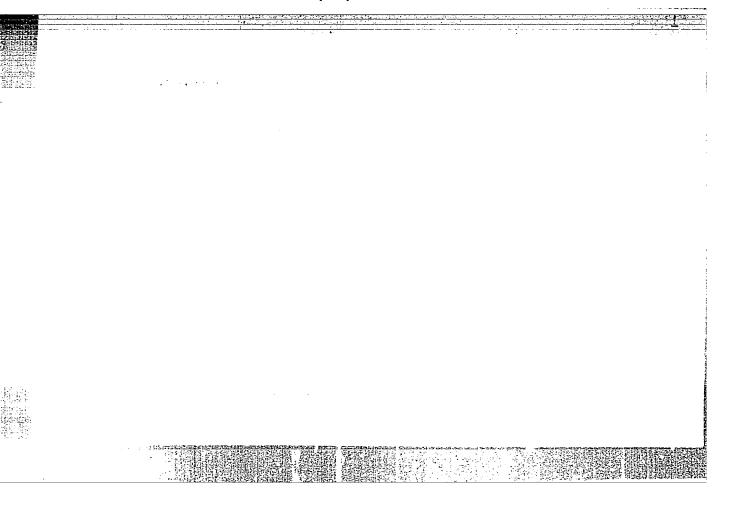Part 2. Inzh.-fiz. zhur. 6 no.8:78-81 Ag '63.   (MIRA 16:10)

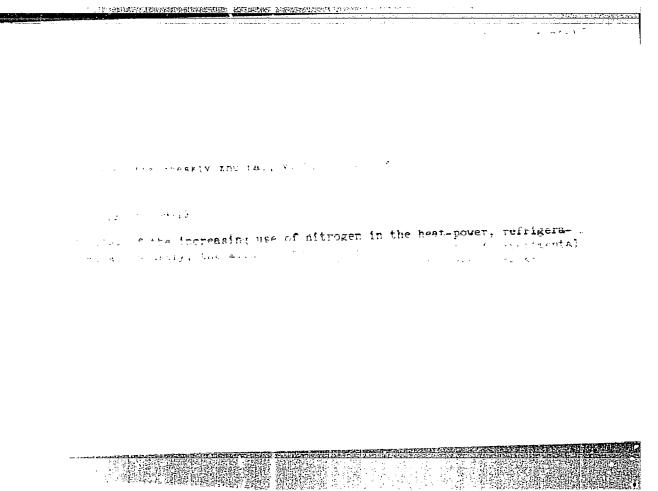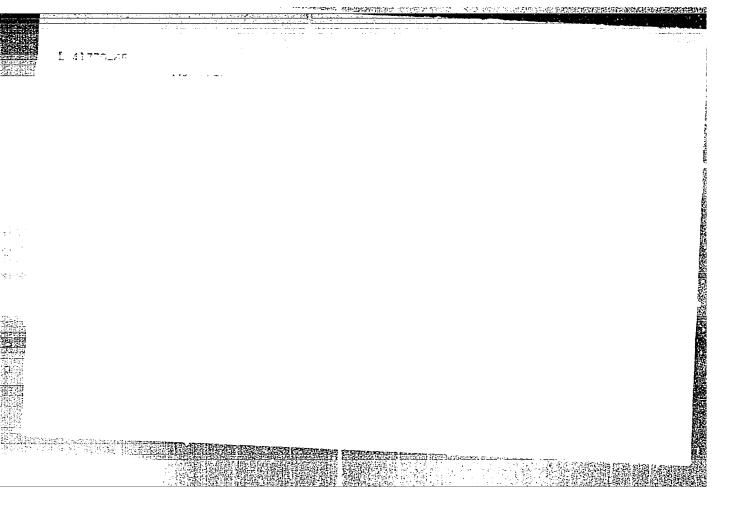1. Institut inzhenerov morskogo flota, Odessa.

molecular interaction potential: $u = 4\epsilon\left[\left(\dfrac{\sigma}{r}\right)^{12} - \left(\dfrac{\sigma}{r}\right)^{6}\right]$, the second and third virial

coefficients can be written in the form: $B(T) = b_0 B^*(T^*)$

... ...RLY IN: IA., V...

... ...9

... e the increasing use of nitrogen in the heat-power, refrigera- .
... ...iy, ...

... thermodynamic similari y between nitrogen, oxygen, and air

L 8939-66   ENT(1)/EWT(m)/EWA(d)/EWP(t)/EWP(b)   LJP(c)   JD

ACC NR: AP5026855   SOURCE CODE: UR/0170/65/009/004/0527/0532

AUTHOR: Kessel'man, P. M.; Kitlyarevskiy, P. A.; Afanas'yev, M. M.

ORG: Industrial Institute im. M. V. Lomonosov, Odessa (Tekhnologicheskiy institut)

TITLE: The equation of state for carbon dioxide in the temperature interval from 273 to 4000 K and at pressures up to 1000x10^5 newtons/m^2

ABSTRACT: The authors attempt to correlate all existing experimental material and to set up an equation of state which reflects the experimental thermal and calorific data on carbon dioxide with a high degree of accuracy. For temperatures from 273 to 800 K and pressures from 1 to 1000x10^5 newtons/m^2, the equation consists of elementary functions of the form:

$$\frac{Pv}{RT_k} = a_0(\omega) + a_1(\omega)\tau + \beta(\omega)\psi + \gamma(\omega)\psi^2 + \delta(\omega)\psi^3 + \lambda(\omega)\psi^4. \quad (1)$$

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UDC:536.71

L 8939-66

ACC NR: AP5026855

The elementary functions α_0, α_2, β , ... have the form

$$A(\omega) = \sum_{1}^{8} a_j \omega^j, \quad \psi = \sum_{1}^{7} b_i \frac{1}{\tau^i} \cdot$$

Values of the coefficients in this equation are given in a table. Analysis shows that, starting with T=770 K, at P=(1-600)x10^5 newtons/m^2, two virial coefficients, B(T) and C(T) are sufficient to set up the equation of state. The virial coefficients are determined from existing experimental data. For the region of parameters T=770 to 4000 K and P=(1-600)x10^5 newtons/m^2, the equation of state was set up in the virial form:

$$\frac{Pv}{RT_x} = \tau + A_1(\tau)\,\omega + A_2(\tau)\,\omega^2, \tag{2}$$

where $A_1 = B d_\kappa \tau$; $A_2 = C d_\kappa^2 \tau$. The coefficients A_1 and A_2 were determined analytically. Results of computer calculations according to Equations 1 and 2 are shown to agree well with existing experimental data. Orig. art. has 2 formulas, 3 figures, and 1 table

SUB CODE: TD, GC/ SUBM DATA: 05Apr65/ ORIG REF: 008/ OTH REF: 012

Card 2/2

L 23453-66   EWT(m)/EWP(j)/T/ETC(m)-6   WW/RM

ACC NR: AP6010038   SOURCE CODE: UR/0170/66/010/003/0385/0392

AUTHOR: Kessel'man, P. M.; Litvvinov, A. S.

ORG: Institute of Technology im. M. V. Lomonosov, Odessa (Tekhnologicheskiy institut)

TITLE: Calculation of the viscosity coefficient of gas mixtures at an atmospheric pressure

SOURCE: Inzhenerno-fizicheskiy zhurnal, v. 10, no. 3, 1966, 385-392

TOPIC TAGS: gas diffusion, atmospheric pressure, gas viscosity, constant coefficient, potential energy, gas kinetics

ABSTRACT: A method for calculating the viscosity of gas mixtures is described. It is based on the use of potential energy with variable potential parameters, formulas of the rigorous kinetic theory of gases, and rules of combination of potential parameters $\sigma_{ij} = 1/2 (\sigma_i + \sigma_j)$ and $\epsilon_{ij} = \sqrt{\epsilon_i \epsilon_j}$. Fair agreement with experimental data is shown. Orig. art. has: 4 figures, 5 formulas, and 5 tables. [Based on authors' abstract] [NT]

SUB CODE: 11,20/   SUBM DATE: 03Jul65/   ORIG REF: 002/   OTH REF: 007/

Card 1/1   UDC: 533.16

L 31326-66   EWT(1)/EWT(m)/EWP(j)/T/ETC(m)-6   IJP(c)   WW/JW/RM

ACCESSION NR: AP5025984

AUTHOR: Kessel'man, P. M.; Chernyshev, S. K.

TITLE: Thermophysical characteristics of some hydrocarbons at high temperatures

SOURCE: Teplofizika vysokikh temperatur, v. 3, no. 5, 1965, 700-707

TOPIC TAGS: hydrocarbon, ethylene, ethane, methane, gas properties, equation of state, heat property, high temperature research

ABSTRACT: The object of the work was the simultaneous determination of the transport properties and the second and third virial coefficients of methane, ethane and ethylene over a wide temperature interval including the high temperature region. The theoretical treatment is based on the following averaged potential function for intermolecular interaction:

$$u = 4\varepsilon(T)\left\{\left[\frac{\sigma(T)}{r}\right]^{12} - \left[\frac{\sigma(T)}{r}\right]^{6}\right\},\qquad(1)$$

in which the potential parameters $\sigma(T)$ and $\varepsilon(T)$ are not constants but are some

Card 1/2

L 31326-66
ACCESSION NR: AP5025984

functions of the temperature. Based on data from the literature, calculated
values of the viscosity and the second and third virial coefficients for methane,
ethane, and ethylene are tabulated for temperatures from 300 to 3000 K. Values of
the viscosity, calculated by this method, are found to agree with experimental
data within 1-2%. However, at high temperatures where experimental data on
compressibility are not available, the use of the potential parameters for a spher-
ical potential found from the second virial coefficient leads to unsatisfactory re-
sults; the deviation in this case between theoretical and experimental values
reaches 10-15%. This is attributed to insufficiently realistic values of the spheri-
cal potential for describing the interaction of nonspherical molecules. A compari-
son of calculated and experimental values of thermal conductivity shows a devia-
tion within the experimental error (from 1-3%, and only reaching 5-6% at low
temperatures). Orig. art. has: 7 formulas, 4 figures, and 4 tables

ASSOCIATION: Odesskiy tekhnologicheskiy institut im. M. V. Lomonosova
                     (Odessa Institute of Technology)
SUBMITTED: 24Jul64   ENCL: 00   SUB CODE: 07, 20
NR REF SOV: 007   OTHER: 015

Card 2/2

L 32072-66   EWT(m)

AUTHOR: Kessel'man, P. M.

ORG: Odessa Technological Institute im. M. V. Lomonosov (Odesskiy tekhnologicheskiy institut)

TITLE: Some similarity criteria for physical properties of compounds

TOPIC TAGS: similarity theory, gas pressure, high temperature technology, solid
physical property, thermodynamic characteristic

ABSTRACT: The criteria which establish thermodynamic similarity of two compounds are
studied to determine those needed to describe properties of compounds with the aid of
chemical potential (with one set of parameters). The discussion is restricted to a
general equation of state retaining only second and third virial coefficients (although
the range of application is wide). This approach is especially useful in high tempera-
ture applications. Experimental data showing the second virial coefficient for several
vapors and gases in the range of 1500°C are quoted. It is shown that the data for
various compounds lie nearly on one universal curve. A similar situation holds for
the coefficient of viscosity shown as a function of the normalized temperature. Ana-
lysis shows that theoretically established criteria for thermodynamic simmilarity is
supported by many experimental results and therefore these criteria can be used with

UDC: 530.17 + 533.1

Card 1/2

L 32072-66

ACC NR: AP6014064

confidence to determine properties of gases that are not known or difficult to establish. Orig. art. has: 5 figures, 1 table, 7 formulas.

SUB CODE: 20/   SUBM DATE: 21May65/   ORIG REF: 005/   OTH REF: 003

Card 2/2

SOV/115-59-10-2/29

25 (1)

AUTHORS: Volkonskiy, V.A., Gol'dinov, M.A., Kessel'man, S.M.,
Nemirovskiy, A.S.

TITLE: The Analysis of Instrument Error Produced by Dis-
crete Action Integrators

PERIODICAL: Izmeritel'naya tekhnika, 1959, Nr 10, pp 4-6 (USSR)

ABSTRACT: An instrumental miscalculation of an integrator ari-
ses only when the φ_i deflection angle of the output
shaft of an integrator varies from cycle to cycle
and the lever which introduces the element to be in-
tegrated remains in a fixed position. This variation
is caused, for instance, by delayed switch-off-and-
on of the counter in each integration cycle. The mis-
calculation represents the difference between φ_i and
the assembly average of the deflection angle φ_{oi}
$\Delta\varphi_i = \varphi_i - \varphi_{oi}$ The corresponding miscalculation of
the measured element for each integration cycle will
be $\delta_u = K\Delta\varphi$ (1)

Card 1/4

The Analysis of Instrument Error   Produced   by   Discrete Action
Integrators

where k is the proportional coefficient between the
deflection angle and the measured element. The authors
further describe an experimental evaluation method of
an instrumental miscalculation and of the integration
error derived from this miscalculation. The integrat-
ion error corresponding to a time period (0, T) will
be

$$\Delta_u = \int_0^T \delta_u(t)\, dt \qquad (2)$$

As the assembly average of an instrumental miscalcula-
tion $M\Delta_u = 0$, so the assembly average of integration
error derived from this miscalculation $M\Delta_u$ is also 0.
The variance of the integration error, derived from
the formula (2) will be

Card 2/4

$$D\Delta_u = \int_0^T\int_0^T R_u(t,s)\, dt\, ds$$

SOV/115-59-10-2/29

The Analysis of Instrument Error Produced by Discrete Action Integrators

where $R_u(t,s) = M\left[\mathcal{J}_u(t)\mathcal{J}_u(s)\right]$ – a correlation function of instrumental miscalculation. If we admit the stability and the ergodicity of the process then

$$DA_u = \int_0^T \int_{-t}^{T-t} R_u(\tau)\,dt\,d\tilde{\tau} \simeq T\int_{-\infty}^{\infty} R_u(\tau)\,d\tau \qquad (3)$$

where $R_u(\tau) = R_u(0,\tau)$. The expression of a correlation connection being

$$\tau_u = \frac{1}{D\mathcal{J}_u}\int_0^{\infty} R_u(\tau)\,d\tau \qquad (4)$$

the (3) and (4) formulae give

$$DA_u = 2T\tau_u D\mathcal{J}_u \qquad (5)$$

Thus, to determine the variance of the integration error DA_u we must know the variance of the instrumental mis-calculation $D\mathcal{J}_u$ and the value τ_u. These values

Card 3/4

SOV/115-59-10-2/29

The Analysis of Instrument Error Produced by Discrete Action Integrators

were determined experimentally for integrators produced by the Khar'kovskiy zavod (Kharkov Plant) "Kip" and by the "Manometr" Plant. A detailed description of this experiment is given. There are 3 graphs, 1 table and 1 Soviet reference.

Card 4/4

NEMIROVSKIY, A.S.; KESSEL'MAN, S.M.

Nomograms for the determination of the error of differential
manometers-flowmeters. Izm. tekh. no.9:49-52 S '63.
(MIRA 17:1)

KESSEL'MAN, S.M.

Slide rule with a special runner for the determination of the basic error of differential manometers-flowmeters corresponding to state standard 3720-60. Izm. tekh. no.12:45-48 D '64.

(MIRA 18:4)

L 9123-66   EWP(k)/EWP(h)/EWP(l)/EWP(v)   BC

ACC NR: AP6018694   SOURCE CODE: UR/0115/65/000/008/0051/0052

AUTHOR: Kessel'man, S. M.

ORG: none

TITLE: First Leningrad conference on problems of engineering psychology in instrument-making

SOURCE: Izmeritel'naya tekhnika, no. 8, 1965, 51-52

TOPIC TAGS: metrology, automatic control, automatic control system, reliability theory, applied psychology, human engineering, scientific conference

ABSTRACT: This conference was held at the All-Union Scientific Research Institute of Metrology in Leningrad, between 12 and 14 May 1965, and it was attended by 300 delegates representing 99 different organizations from 14 cities in the USSR. A total of 28 papers was presented and discussed at the conference with respect to the problems arising in the evaluation of human performance in the handling of various types of devices in semiautomatic control systems. The subjects to which the papers pertained included: the "man-machine" system from the standpoint of the place and role of man in the control process, his potential for performing specified functions, and the optimal conditions for and methods of his activity; the development of technical means of acquisition and presentation of metro-

Card 1/2   UDC: 154.4(063):681.2

L 29123-66

ACC NR: AP6018694

/

logical information; the physiological factors that must be considered in
the design of instruments and indicators; a mathematical model of the
optimal expenditures of time by the operator at a power-unit control panel;
the theory of reliability as applied to the human operator of control systems;
statistical methods of reliability control in the "man-automaton" system;
automatic control of the changes in the emotional state and attentiveness of
the operator in the "man-machine" system; features of the perception of dif-
ferent types of control-and-measuring indicators; factors determining the
rate of data processing by the human operator; effectiveness of the percep-
tion of visual signals in different tasks as a function of the density of
their layout on the control panel; certain principles of the design of coding
systems. The resolution adopted by the conference points out that the co-
ordination of the means and techniques of data indication with the human
psychophysiological characteristics is a major prerequisite for perfecting
measurement apparatus. Further, it recommended the drafting of a glossary of
terms used in engineering psychology. /JPRS/

SUB CODE: 13, 14, 05 / SUBM DATE: none

Card 2/2

POLAND/General and Special Zoology. Insects   P

Abs Jour : Ref Zhur - Biol., No 6, 1958, No 25815

Author   : Kesselring W.
Inst   : Not Given
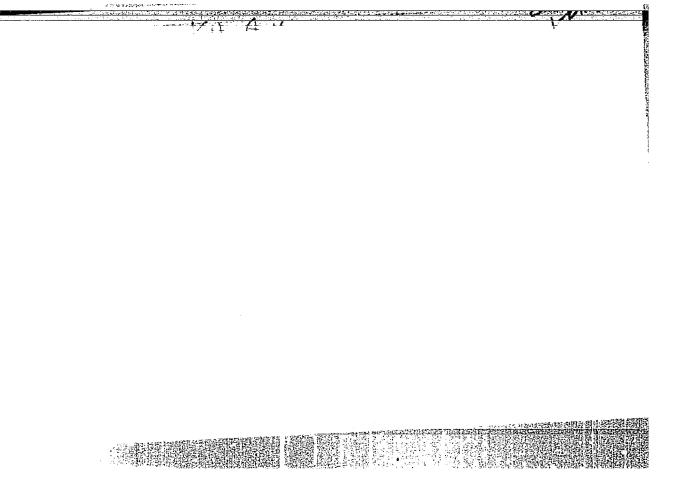Title   : Some Notes on the Outbreak of Propagation of Measuring Worm
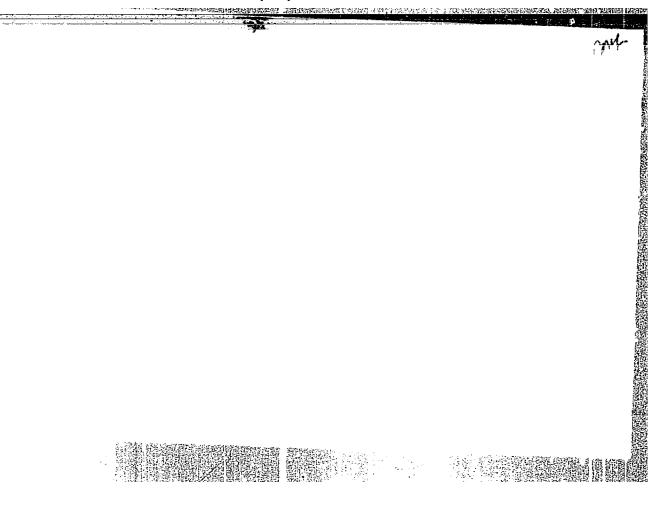   Moths and on Their Control. (Nekotoryye zamechaniya o vspychke
            razmnozheniye sosnovoi pyadenitsy i o bor'be s ney.)

Orig Pub : Las polski, 1956, 30, No 4, 24-26

Abstract : Biological measures could not prevent the breeding of measuring
            worm moths in 1955, because of the inadequacy of work in
            attracting insectivorous birds. The weather conditions in
            1953-1954 were favorable to the pest. In spite of the fact
            that the density of egg-laying in 1954 and 1955 was consider-
            ably lower then the density regarded as destructive, the
            larvae caused great damage.

Card   : 1/1

Card 1/1

24,7900 (1055,1144,1163)

AUTHOR: ~~Kessenikh, A. V.~~

TITLE: The effect of spin diffusion on dynamic polarization of nuclear spins

PERIODICAL: Fizika tverdogo tela, v. 3, no. 11, 1961, 3260 - 3262

TEXT: The effect of dynamic nuclear polarization is of great interest, especially in irradiated polymers, which might be used as polarized nuclear targets with high proton content. In the present paper the diffusion equation $\partial p/\partial t = D\Delta p + (P_0 - p)/T_1$ (Bloembergen, Physica, $\underline{15}$, 386, 1949) is solved for polarization of nuclear spins with dynamic nuclear polarization. The nuclei are assumed to interact directly with the paramagnetic centers and nuclear spin - lattice relaxation is taken into account. $D = a^2/\lambda T_2$, T_2 - nuclear spin-spin relaxation time, T_1 - spin-lattice relaxation time, λ - a numerical factor of the order of $10^1 - 10^2$, P_0 -

thermal equilibrium of nuclear spin polarization. The system is assumed

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The effect of spin diffusion on ....

to consist of spheres of radius $R = a \sqrt[3]{N/n}$ around the paramagnetic centers; a is the distance between the nuclei, n the number of centers and N the number of nuclei per unit volume. For spherical symmetry the polarization p of a spherical layer with radius r the steady-state equation

$$Dr \frac{\partial^2 (rp)}{\partial r^2} = \frac{p - P_0}{T_1}$$ holds. With the boundary conditions $p(r) = P_0$ for

$r \rightarrow \infty$, and $p(r) = P_D$ for $r = b = a \sqrt[3]{\gamma_e/\gamma_n} = 1/\beta$,

$p(r) = P_0 + (P_D - P_0)e^{-\alpha r}/\beta r$ is found to be its solution. $\alpha = 1/\sqrt{DT_1}$,

$\gamma_e/\gamma_n = P/P_0$, γ_e, γ_n are the gyromagnetic ratios of electron and nucleus, respectively. P_D will be the polarization for nuclei which are directly

connected by interaction with the spin of a paramagnetic center in the case of electron paramagnetic resonance saturation. The mean effective

polarization is found to be $P = P_0 + (P_D - P_0) \frac{T_1}{\lambda T_2} \sqrt[3]{\frac{\gamma_e}{\gamma_n}} \frac{n}{N}$

This relation makes sense only for low concentrations $n/N \ll 1$. It is no

Card 2/4

The effect of spin diffusion on ...

77O
S/181/61/003/011/002/056
B102/B138

longer applicable if $R \to \sqrt[3]{\dfrac{1}{\alpha^2 \beta}}$, or for concentrations $n/N \to \dfrac{\lambda T_2}{T_1} \sqrt[3]{\dfrac{r_e}{r_n}}$

(in solids $T_2 \ll T_1$). P_D depends on the kind of center. The centers can be divided into three groups: Those with positive dynamic nuclear polarization, those with negative dynamic nuclear polarization, and inactive centers. These types of centers differ in their e.p.r. saturation conditions. With a parameter s taking this into account, the mean value of P_D is given by $P_D = F(r_e/r_n) s P_0$; F is a function of e.p.r. and of the nuclear magnetic resonance line shapes. The optimum concentration of paramagnetic centers is given by $n/N \simeq \dfrac{\lambda T_2}{T_1} \sqrt[3]{r_e/r_n}$. The author thanks V. L. Karpov for discussions. There are 6 references: 1 Soviet and 5 non-Soviet. The four most recent references to English-language publications read as follows: A. Overhauser. Phys. Rev., 92, 411, 1953. M. Abraham, M. A. H. McCousland, F. N. H. Robinson. Phys. Rev. Let., 2, 449, 1959. I. E. I. Hardeman. Philips Res. Repts., 15, 587, 1960. C. Hwang, T. M. Sanders.
Card 3/4

S/181/61/003/011/002/056
The effect of spin diffusion on ...   B102/B138

Conference on Low Temperature Physics Toronto, p. 98, 1960.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im.
              L. Ya. Karpova Moskva (Physicochemical Scientific Research
              Institute imeni L. Ya. Karpov, Moscow)

SUBMITTED: May 3, 1961

Card 4/4

89200

1273, 1242, 1043

5.4130

24.7900 (1147, 1158, 1395, 1160)

S/056/61/040/001/005/037
B102/B204

AUTHOR: Kessenikh, A. V.

TITLE: Overhauser effect and "secondary signal" in electron para-
magnetic resonance

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40,
no. 1, 1961, 32-33

TEXT: The author reports on studies of the relative increase of the proton
polarization in the free radical diphenyl picryl hydrazyl at room tempera-
ture during the saturation of electron paramagnetic resonance; proton
polarization was determined from the amplitude of the nuclear magnetic
resonance signal on the screen of the oscilloscope. The studies were car-
ried out on a 30 mm^3 solid diphenyl picryl hydrazyl in fields of about
3300 oe. As may be seen from Fig. 1, the relative signal intensity I/I_0 of
the nuclear magnetic resonance of protons increases exponentially with
the amplitude H_1 of the h-f magnetic field. With $H_1 > 1.5$ oe, the effect of
the "emission of two quanta" (9300 and 14 Mc/sec) in electron paramagnetic
resonance, which has already been described by Winter, could also be ob-
Card 1/3

Overhauser effect and ...

served. This effect occurs with the simultaneous action of an electro-magnetic radiation having the frequency ω_1 upon the system of electron spins in the constant magnetic field H_0 and another radiation having the frequency ω_2. $\omega_1 \pm \omega_2 = \gamma_e H_0$ is the condition for the occurrence of the "secondary signal" at ω_2. Fig. 3 shows an oscillogram of a signal representing a superposition of a nuclear magnetic resonance signal with a peak in the H_0 field, and a "secondary signal" of the electron paramagnetic resonance at the frequency ω_n, consisting of absorption and emission signals, which are shifted by $\pm \omega_n/\gamma_e = 5$ oe toward the H_0 field. Also the signals described in Ref. 3 are, in the opinion of the author, a superposition of a nuclear magnetic resonance signal with a "secondary signal" of electron paramagnetic resonance in the case of a shift of the nuclear magnetic resonance signal from the maximum of the Overhauser effect. The author thanks Professor Ye. I. Kondorskiy and Ye. S. Goryunov for their collaboration. There are 3 figures and 3 references: 1 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

Card 2/3

Overhauser effect and ...

SUBMITTED: July 8, 1960

Legend to Fig. 3: a) superposition of a nuclear magnetic resonance signal (central peak) by a "secondary signal" of electron paramagnetic resonance (outer peaks), $H_1 = 2.5$ oe. b) "secondary signal" of electron paramagnetic resonance, $H_1 = 2.2$ oe.

Fig. 3

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11.1510

AUTHOR: Kessenikh, A.V.

TITLE: The investigation of dynamic polarization of nuclear
            spin in free radicals

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Fizika.
            no.1, 1962, 144-150

TEXT: At the present time much attention is given to improved
methods of investigating dynamic polarization of nuclear spin
(D.P.N.).   An increasing nuclear magnetic resonance (N.M.R.)
signal is observed with saturated electron paramagnetic resonance
(E.P.R.), which was predicted for the first time by A. Overhauser.
The increase in N.M.R. (A) by the Overhauser effect is given by

$$A = 1 + \rho fs \frac{\gamma_e}{\gamma_n} \frac{I(I + 1)}{S(s + 1)} \qquad (1)$$

where γ_e, S are the gyromagnetic relation and spin of the
electron and γ_n, I for the nucleus.   The other coefficients
are defined in detail in the original paper.   The D.P.N. effect
has been investigated previously for solutions of paramagnetic ions
Card 1/ 3

The investigation of dynamic ...

and free radicals in low and high fields.   In the study of
paramagnetic salts, crystals and pure free radicals with short
relaxation times there are difficulties because of the necessity
of obtaining large amplitude fields and conducting away the heat
produced in the sample.   In this paper dynamic polarization of
protrons is investigated in free radicals of diphenylpicryl-
hydrazyl (D.F.P.H.) at room temperature and for fields of 3300 to
3400 oersteds.   The sample of D.F.P.H., consisting of 30 to
50 mm^3 of powder sealed in a teflon ampule, is placed with a coil
inside a resonator situated between the poles of a large electro-
magnet with a stabilized current supply.   The frequency for
E.P.R. is in the range 9300 to 9400 Mc/s and for N.M.R. 14.0 to
14.2 Mc/s.   Results are recorded photographically from an
oscilloscope.   The increase in the N.M.R. signal A for protons
in D.F.P.H. is shown to be a function of the intensity of the
magnetic field H_1 in the resonator;   the experimental points
falling on a curve given by

$$A = 1 + 70 \frac{10^{-1} \cdot H_1^2}{1 + 10^{-1} \cdot H_1^2} \qquad (5)$$

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The investigation of dynamic ...   S/139/62/000/001/024/032
E039/E435

The narrowing of N.M.R. lines with saturated E.P.R. was studied
and can be used as a direct measure of s - the saturation factor
for E.P.R.   Acknowledgments are expressed to Professor
Ye.I.Kondorskiy for proposing the experimental arrangement.
There are 4 figures.

ASSOCIATION: Moskovskiy gosuniversitet imeni M.V.Lomonosova
            (Moscow State University imeni M.V.Lomonosov)

SUBMITTED: June 28, 1961

Card 3/3

S/181/63/005/002/009/051
B104/B186

AUTHORS: Kessenikh, A. V., Lushchikov, V. I., Manenkov, A. A., and
              Taran, Yu. V.

TITLE: Proton polarization in irradiated polythene

PERIODICAL: Fizika tverdogo tela, v. 5, no. 2, 1963, 443 - 454

TEXT: The aim is to find materials suitable for polarized proton targets,
and to investigate the physical properties of irradiated polythene. To
this end the studies of dynamic polarization in high-density polythene
irradiated with fast protons (V. I. Lushchikov, A. A. Manenkov, Yu. V. Taran,
FFT, 3, 3503, 1961) were continued. The dynamic nuclear polarization was
measured at 77, 4.2 and 1.6°K in a magnetic field of ∿3400 oe using a
device described in a previous paper. The 17,9.6 mm test pieces were placed
in the coil of an autodyne n.m.r pickup, with the axis of the coil per-
pendicular to the long side of the resonator. H_{102} oscillations with a
frequency of 9440 Mc/s were set up in the resonator. The dynamic polariza-
tion factor of the protons was determined from the amplification factor of
the n.m.r. signal at saturated e.p.r. of the free radicals formed when the

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Proton polarization in...

S/181/63/005/002/009/051
B104/B186

polythene was irradiated. Results: In the He temperature range, the cross-relaxation under conditions of non-uniform e.p.r. line broadening plays an important part in the dynamic polarization of the nuclei. This can be used to explain the increase in the broadening of the dynamic nuclear polarisa-tion maxima as the temperature decreases, and the fact that the dynamic polarization factor does not depend on temperature. The time dependence of the n.m.r. lines is described as the sum of two exponents with relaxation times of T_1 and T_2. The nuclear relaxation depends linearly on T_1 and T_2, this result being contrary to theoretical predictions (O. S. Leifson, C. D. Jeffries, Phys. Rev., 122, 1781, 1961). It is explained on the assumption that the action zone of the paramagnetic centers is equalized at the expense of fast spin diffusion. The dynamic polarization coefficient depends linearly on the molecular weight of the initial material. There are 6 figures.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute imeni P. N. Lebedev AS USSR); Nauchno-issledovatelʹkiy fiziko-khimicheskiy institut im. L. Ya. Karpova, Moskva (Scientific Physicochemical Research Institute imeni L. Ya. Karpov, Moscow)

Card 2/3

Proton polarisation in...

S/181/63/005/002/009/051
B104/B186

SUBMITTED: August 6, 1962

Card 3/3

S/181/63/005/004/028/047
B102/B186

AUTHORS: Kessenikh, A. V., and Manenkov, A. A.

TITLE: Dynamic polarization of nuclei in the case of saturation of non-uniform e.p.r. line broadening

PERIODICAL: Fizika tverdogo tela, v. 5, no. 4, 1963, 1143 - 1146

TEXT: Since cross relaxation between spin transitions plays a role in the case of saturation of non-uniform e.p.r. line broadening, it may be assumed that this will also affect dynamic polarization of nuclei which is due to saturation of forbidden e.p.r. transitions (FTT, 5, 443, 1963). An exact solution to the problem of saturation of non-uniform e.p.r. line broadening is very complex when cross relaxation has to be taken into account; there-fore the authors have developed an approximate method allowing of qualitative comparison with experiment.. On the basis of a phenomenological model using Portis' approximation (Phys. Rev. 104, 584, 1956) a qualitative theory of temperature and concentration dependences of dynamic nuclear polarization is developed which takes account of cross relaxation. The cal-culations are made for nuclei with $I = 1/2$ and saturation of the magnetic resonance of the electron spins ($S = 1/2$). The optimum conditions for

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dynamic polarization are discussed; they have to be known for a proper choice of a suitable polarized nuclear target. The theory was found to be qualitatively applicable to $La_2Mg_3(NO_3)_{12} \cdot 24H_2O$ (Phys. Rev. 122, 1781, 1961) and irradiated polyethylene at helium temperatures. The experimental data on proton polarization at $4.2^\circ K$ in these substances show that the dynamic polarization coefficient η passes through a maximum when the temperature of the concentration of paramagnetic centers is varied; the distance between the extrema of η as a function of the magnetic field increases monotonically with decreasing temperature and increasing concentration of the paramagnetic centers (in the present case Ce^{3+} in 0.1 - 1% concentrations). The theoretical result, namely that the extrema of η will arise at the lower temperatures the lower the concentration of the centers, is not yet verified experimentally but appears reasonable. Deviations from the theory may arise in the case of extraneous relaxation or cross relaxation between allowed and forbidden transitions.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute imeni P. N. Lebedev AS USSR); Fiziko-khimicheskiy institut im. L. Ya. Karpova Moskva (Physicochemical Institute imeni L. Ya. Karpov, Moscow)

Card 2/3

Dynamic polarization of nuclei...

S/181/63/005/004/028/047
B102/B186

SUBMITTED: November 27, 1962

Card 3/3

KESSENIKH, A.V.

Use of methyl dichlorosilane in determining the resolving power of nuclear magnetic resonance spectrometers. Opt. i spektr. 14 no.2: 315-316 F '63.   (MIRA 16:5)
  (Silane—Spectra) (Nuclear magnetic resonance and relaxation)

KESSENIKH, A.V.; LUSHCHIKOV, V.I.; MANENKOV, A.A.; TARAN, Yu.V.

Polarization of protons in irradiated polyethylenes. Fiz. tver.
tela 5 no.2:443-454 F '63.   (MIRA16:5)

1. Fizicheskiy institut imeni P.N.Lebedeva AN SSSR i
Nauchno-issledovatel'skiy fiziko-khimicheskiy institut
imeni L.Ya.Karpova, Moskva.
      (Polymers, Effect of radiation on) (Protons)

KESSENIKH, A.V.; MANENKOV, A.A.

Dynamic polarization of nuclei by the saturation of nonuniformly broadened lines of electon paramagnetic resonance. Fiz.tver. tela 5 no.4:1143-1146 Ap '63.   (MIRA 16:4)

1. Fizicheskiy institut imeni P.N.Lebedeva AN SSSR i Fiziko-khimicheskiy institut imeni L.Ya.Karpova, Moskva.
                    (Polarization (Nuclear physics))
                    (Paramagnetic resonance and relaxation)

L 17999-63
RM/wh/MAY

EWP(j)/EPF(c)/EWT(m)/BDS   AFFTC/ASD   Pc-4/Pr-4

ACCESSION NR: AP3001284

S/0181/63/005/006/1640/1642 74

AUTHORS: Kessenikh, A. V.; Lushchikov, V. I.; Manenkov, A. A.; Taran, Yu. V. 68

TITLE: Relaxation and dynamic polarization of protons in polyethylenes

SOURCE: Fizika tverdogo tela, v. 5, no. 6, 1963, 1640-1642

TOPIC TAGS: proton, dynamic polarization, spin diffusion, nuclear magnetic resonance, polyethylene, molecular weight, ultra-high frequency

ABSTRACT: The authors started with data from V. I. Lushchikov, A. A. Manenkov, and Yu. V. Taran (FTT, 3, 3503, 1961) and A. V. Kessenikh, V. I. Lushchikov, A. A. Manenkov, and Yu. V. Taran (FTT, 4, 433, 1963) concerning the dependence of dynamic polarization in polyethylenes on the average molecular weight. They expected the coefficient of dynamic polarization to be about 60 when the molecular weight was 2.3×10^6. To test this view and to refine the results of the cited papers, they made this study on several samples of polyethylene bombarded by fast neutrons. Measurements were made on a setup described in the first of the above papers, at 77, 4.2, and 1.6K. These experiments have shown that within the limits of experimental accuracy the resolution of dynamic polarization at ultra-high-frequency output and restoration of nuclear polarization after removal of nuclear-

Card 1/2

L 17999-63

ACCESSION NR: AP3001284

6

magnetic-resonance saturation are described by exponents with identical value of the time of nuclear relaxation. This indicates that the theory of spin diffusion (G. R. Khutsishvili (ZhETF, 42, 1311, 1962)) is equally applicable to dynamic polarization. The measured values of dynamic polarization proved to be smaller than expected and the authors ascribe the difficulty of demonstrating dependence of this property on molecular weight to peculiarities in the technology of preparing the samples. "In conclusion the authors thank B. I. Kokorev for his aid in the work and they thank V. L. Karpov, Doctor of Chemical Sciences, for a number of interesting discussions. They also take this opportunity to express their thanks to T. I. Terekhov and Yu. P. Vyrtskiy for determining the molecular weight of one sample and N. A. Slovokhotov for studying the infrared spectrum of the same sample." Orig. art. has: 1 table.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova, Moscow (Physical and Chemical Institute)

Card 2/2

ACCESSION NR: AP4019845   S/0181/64/006/003/0827/0830

AUTHORS: Kossenikh, A. V.; Manenkov, A. A.; Pyatnitskiy, G. I.

TITLE: Discussion of experimental data on dynamic polarization of protons in irradiated polyethylenes

SOURCE: Fizika tvordogo tela, v. 6, no. 3, 1964, 827-830

TOPIC TAGS: polarization, polyethylene, ultra high frequency irradiation, magnetic resonance, magnetic property

ABSTRACT: The authors have investigated samples of polyethylene of high density, containing $10^{18} - 10^{19}$ cm^{-3} polyene radicals: $CH_2-(CH)_{2M-1}-CH_2$, where $M > 2$. Studies were made at 77, 4.2, and 1.6K. The frequency of the ultra-high-frequency generator was kept constant, but the magnetic field was varied, and the intensity of the nuclear magnetic resonance signal was measured in its relation to the magnetic field. It was assumed that the relations between the probabilities of different spin transitions, during ultra-high-frequency irradiation of paramagnetic centers with irregularly expanded electron paramagnetic

Card 1/2

ACCESSION NR: AP4019845

resonance lines, are determined by the relations among rates of establishing equilibrium within the spin system and equilibrium of spin with the lattice. The dynamic polarization of protons was found to decline very rapidly (negative values) with increase in magnetic field, reach a minimum, then increase very rapidly (passing through zero) with further increase in field, reach a maximum, and then decline again. Theoretical values were found to correspond closely to experimental values in values of magnetic field whore the minimums and maximums occur, but the theoretical values of the minimum and maximum proved to be numerically greater than the experimental values. The authors point out that it is possible to compute, within the framework of the model they employ, the effect of combination spin transition saturation on electron polarization, which cannot generally be neglected in calculations. Orig. art. has: 2 figures and 3 formulas.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova, Moscow (Physico-chemical Institute)

SUBMITTED: 02Sep63

SUB CODE: SS, EC

DATE ACQ: 31Mar64

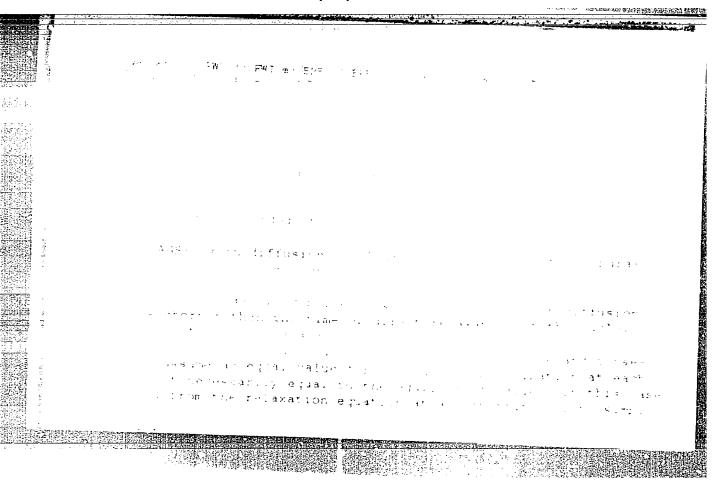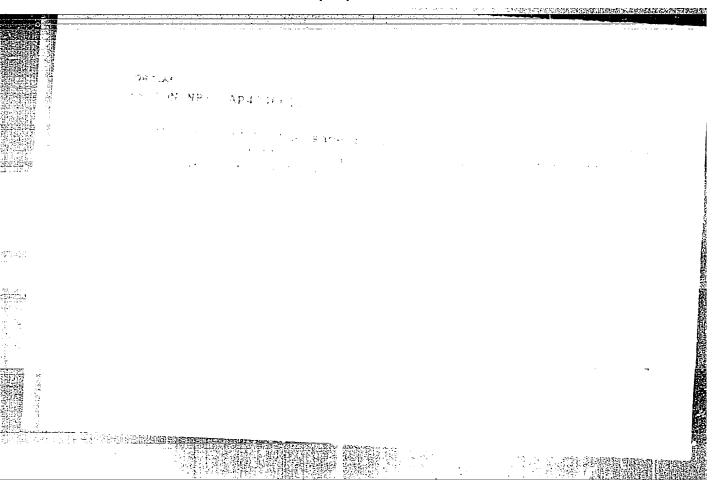NO REF SOV: 004

ENCL: 00

OTHER: 003

Card 2/2

ALEKSANDROV, I.V.; KESSENIKH, A.V.

Theory of spin-lattice relaxation of polymer radicals in a
solid. Fiz. tver. tela 6 no. 4:1006-1012 Ap '64.

(MIRA 17:6)

1. Nauchno-issledovatel'skiy fiziko-khimicheskiy institut imeni
Karpova, Moskva.

KESSENIKH, Aleksandr Vladimirovich; FAYHBOYM, I.B., red.

[Nuclear magnetic resonance] IAdernyi magnitnyi rezo-
nans. Moskva, Izd-vo "Znanie," 1965. 31 p. (Novoe v
zhizni, nauko, tekhnike. IX Seriia: Fizika. Matematika.
Astronomiia, no.5)   (MIRA 18:2)

ALEKSANDROV, I.V.; KESSENIKH, A.V.

Isotropic superfine interaction and spin-lattice relaxation of radicals
in the solid phase. Part 4. Teoret. i eksper. khim. 1 no.2:221-228 Mr-
Ap '65.   (MIRA 18:7)

1. Institut khimicheskoy fiziki AN SSSR, Moskva i Nauchno-issledovatel'skiy
fiziko-khimicheskiy institut imeni L.Ya.Karpova, Moskva.